LL123U Programming for teachers, with focus on technology or mathematics education 7.5 credits

Grundläggande programmering med teknikdidaktisk eller matematikdidaktisk inriktning, för lärare i grundskolan 7-9

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for LL123U valid from Autumn 2018

Grading scale

P, F

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

This course is intended for active teachers within the senior years of secondary school and is offered on behalf of the Swedish National Agency for Education. Special conditions for eligibilty apply, please refer to their webbpage.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

Within the programming part of the course the student should after the course be able to:

- Solve problems via constructing a program consisting of up until fivehundred lines in a modern programming language

- Apply and explain rules and proper practices of coding (such as comments, error handling, code structure, flexibility). Follow the syntax rules of the used programming language and then be able to discover and correct errors in the code. Modify given programs.

- Transfer data between a file and a program, identify the need for and make use of control structures (conditons and loops), split a large problem into smaller manageable parts and construct their corresponding functions. Use the data structures that are built in to the programming language and choose the data structure that helps solves a given problem

- Examine programs created by others in order to use programming to solve problems, apply the method of problem solving also outside of programming, discuss software development with experts and assess commercial programs.

 Within the didactical part of the course the student should be able to:

- be sufficient in using methods for using programming in mathematics or technology teaching, which include: be able to identify elements och parts of the respective course/sub-ject-plans where programming is a useful instrument.

- Identify and make use of programming languages, tools and and programming environments that are relevant for teaching programming in mathematics or technology teaching in elementary school

- Utilize didactical practices for teaching programming in elementary school

Course contents

The programming part of the course aims to give the student:

- An introduction to computer science concepts, which includes: programming in a modern programming language, data structures and problem solving by dividing it into subproblems.

- Knowledge about the basic concepts and building blocks within programming, which includes sequences, alternatives, conditions, loops and functions.

- Knowledge of algorithmic thinking.

- Possibility to create, troubleshoot, and test code. Code in a textbased programming language and get an orientation in another programming language.

- Possibilty to read, understand, troubleshoot, test and improve existing program code.The course part focused on technology teaching aims to give the student:

- Orientation of relevant research in the didactics of technology.

- Understanding of technical solutions that contains programming

- Knowledge of didactic content and practice for teaching programming within the technology subject and across subjects.

The course part focused on mathematic teaching aims to give the student:

- Orientation of relevant research in mathematical didactics and programming didactics, and excercises in how to turn didactical principals into their teaching.

- Understanding of how programming strengthens the mathematical abilities of the student, with focus on problem solving and exploring concepts

- Understanding of how programming kan be used to support mathematical problem solving on elementary school level.

- Knowledge of didactic content and practice for teaching programming within mathematics and across subjects.

Disposition

This course is offered in the form of flexible learning with approximately four compulsory meetings at KTH. Between these meetings, the students manage their learning via a webbplatform and other means.

Course literature

Kurslitteraturen för programmeringsdelen av kursen kommer finnas fritt tillgänglig via webben. Övrig kurslitteratur anslås senast tre veckor före kursstart.

Equipment

Computer with internet connection. Program installtion will be necessary.

Examination

- LAB1 - Laboratory work, 1.0 credits, grading scale: P, F
- LAB2 - Laboratory work, 1.5 credits, grading scale: P, F

- LAB3 - Laboratory work, 2.5 credits, grading scale: P, F
- SEM1 - Assignment in technology education, 2.5 credits, grading scale: P, F
- SEM2 - Assignment in mathematic education, 2.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Pass in all modules included in the course.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.